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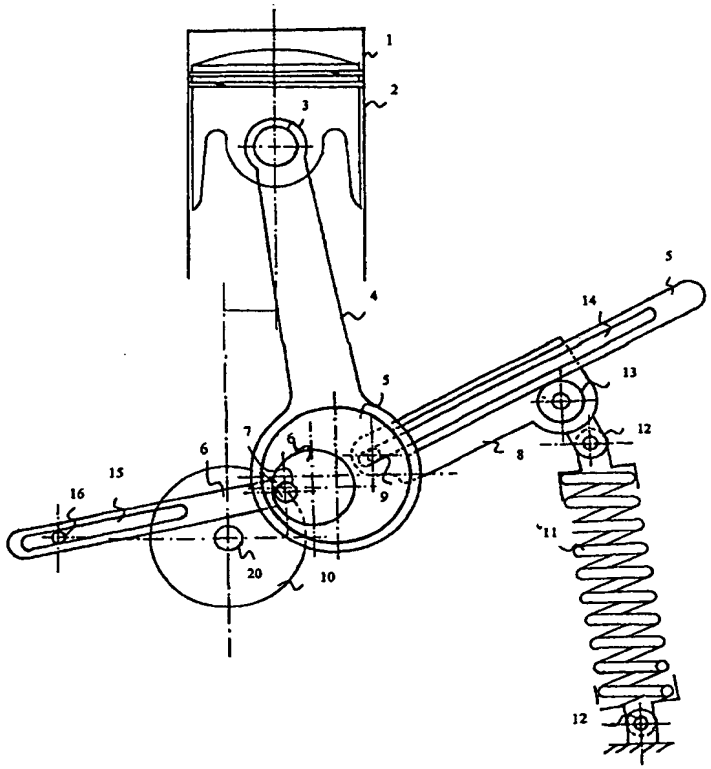
(54) Title: ECCENTRIC AND SPRING SYSTEM FOR THE INTERNAL AND EXTERNAL COMBUSTION PISTON MOTORS

(57) Abstract

In the system consisting of two coaxial eccentrics (5 and 6) one within another, in the connecting rod (4), guiding arms directly connected to these eccentrics and a spring (11) one end of which is connected to the spring compression mechanism (8) and the other end to the motor body, the spring (11) is completely stretched when the piston (2) is at the upper dead point. By the rotation of the crank shaft (20), the piston (2) pushes down the connection rod (4) from the dead point, with the pressure of combusting gas. The stretched spring (11) being supported by the cocking catch lever support, pushes the larger eccentric (5) downwards by means of the cocking catch lever. Both impacts influence the smaller eccentric (6) inside the larger one (5) and the crank peg (7) inside the small eccentric (6) is pushed down by an additional moment arm, thus increasing the turning moment applied on the crank shaft (20).



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ECCENTRIC AND SPRING SYSTEM FOR THE INTERNAL AND EXTERNAL COMBUSTION PISTON MOTORS

The present invention is related with realizing the production of a more efficient, more powerful and more environment friendly high speed motor, with a spring mechanism that elongates the crank moment arm, independent from the piston stroke and crank shaft rotational circumference in the internal-and external-combustion motors.

In the conventional motors the moment arm length is equal to the radius of maximum crank shaft rotation circumference or to the half of the piston stroke.

In the patent No. 95/00742 wherein a longer moment arm is provided by means of the eccentrics, separately from the crankshaft rotation circumference and the piston stroke, the crank peg is fixed whereas the piston stroke is variable and the induction and explosion strokes are different. The induction stroke is greater. A spring is placed between the eccentrics inside the connection rod (4). The compression ratio varies depending on such factors as changing the support points of spring compressing arms and fixing them, approaching or diverging of the piston to the dead point due to the position of the spring between the eccentric coaxial pieces in the connection rod (4). This provides more power and higher torque at high speeds. However, both eccentric pieces in the connection rod (4) are under the impact of the spring, which leads to problems during the production phase.

The object of the present invention is to elongate the moment arm in internal and external combustion motors with pistons, by changing the center of the connection rod (4) to the utility direction whereas the two eccentrics in the connection rod (4) and crank shaft center remain fixed, wherein the crankshaft arm axis to which

the connection rod (4) is joined and the connection rod (4) axis also remain fixed; and consequently a more environment friendly, more efficient and more powerful high-speed motor production is realized.

In the motors realised in order to achieve the objects of the present invention, the spring mechanism that enhances the motor torque, motor power and motor speed by elongating the crank moment arm, is illustrated in the attached drawings, wherein:

Figure 1) shows the components of the spring mechanism,

Figure 2) shows the crank peg axis, small eccentric axis and big eccentric axis (connection rod axis) at the rotated positions of the crank shaft at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°, 360°.

The components shown in the drawings have been numerated separately as follows:

1) Cylinder
2) Piston
3) Piston peg
4) Connection rod
5) Larger eccentric and the eccentric spring compressing arm fixed on it,
6) Smaller eccentric and the eccentric directing piece arm fixed on it,
7) Crank peg
8) Spring stretching (compressing) mechanism
9) Spring stretching support ball
10) Crank shaft rotation circumference
11) Spring
12) Spring stretching ankle
13) Spring stretching mechanism sliding roller
14) Movement channel for larger eccentric spring clamping arm support ball

15) Smaller eccentric guiding support ball channel

16) Smaller eccentric guiding support ball channel

17) Smaller eccentric centres at eight different points

18) Larger eccentric centers at eight different points (connection rod center)

19) Shows the path (route) of the connection rod center,

20) Crank shaft.

The spring mechanism that enhances the motor power, torque and speed by elongatine the crank moment arm, in internal and external combustion piston motors, consists of two coaxial eccentrics (5 and 6) placed on the crank peg (7) in the connection rod (4), and a guiding arm (6) connected directly to the small eccentric piece moving in connection with these eccentrics, a spring compressing arm (5) and spring compressing mechanism (8) directly connected to the larger eccentric, and a spring (11) one end of which is connected to the spring compression mechanism (8) and the other end, to the motor body. The guiding arm (5) manufactured with one end fixed to the smaller eccentric, is provided with a channel (15) on its other end. The guiding support ball (16) connected to the motor body is engaged into the said channel (15)., When the crank shaft rotates and the motor starts to run, the eccentric (6) moves in connection with the support in the connection rod (4). With this movement the center of the connection rod (4) changes, furthermore, the spring compression mechanism (8) and the assembly that facilitates the compression of the spring (11) moves around the axis, proportionally as much as the compression arm (5) and the spring compression allows, by being supported from the spring compression axis or from any suitable location. The compression spring assembly consists of the larger eccentric and the guiding arm (5) fixed to it, a sliding roller bearing for the spring compression mechanism (13), spring compression joints (12), spring (11), crank shaft rotation circumference (10), smaller eccentric guiding support roller (15) and spring compression mechanism (8).

When the piston is at the dead point, the spring is in a completely compressed state. When the crank shaft (20) starts to rotate clockwise, the piston (2) pushes the connection rod (4) down from the dead point by means of the pressure created by the gas exploded in the cylinder (1). This pushing motion is additionally effected by the compressed spring (11) being supported by the compression arm bracket, pushing the larger eccentric downwards by means of the compression arm (5). Both effects act on the smaller eccentric (6) in the larger one (5) and the crank peg (7) inside the small eccentric (6) is pushed downwards by an additional moment arm. Consequently the turning moment applied on the crank shaft (20) is enhanced due to the effect of the additional moment arm on the crank peg (7).

The piston (2) pressure acting on the connection rod (4) is greater than the pressure action on the piston (2) at angular positions, due to the eccentrics inside the connection rod (4). In other words, the pressure turning the crank shaft (20) is more and the moment arm (length t) is longer; thus providing positive gain in significant amounts. Furthermore due to the fact that the effect point location of the spring (11) on the spring compression arm (5) acting on the arm from the spring compression mechanism (8) is fixed and the effect point acting on the crank peg (7) is movable, while tightening the spring (11), the spring (11) can be compressed with a larger moment arm. After the tightening of the spring (11) the moment arm remains constant with respect to the support point whereas the other arm is far shorter than the arm which tightened the spring. This situation provides numerous advantages with respect to moment arm and spring selection.

As the crank shaft axis and the cylinder (1) and piston (2) driving axis are completely different; this difference causes the piston (2) to provide more effective action of the pressure inside the cylinder (1) in the positive direction. In other words, the difference between the crank peg (7) center and the connection rod (4) center, holds the piston (2) at a position, higher than that of the crank peg (7) and therefore it is more effected by the pressure created by the explosion in the cylinder.

CLAIMS

1. Eccentric and spring system in the internal and external combustion motors with piston, characterized in that the spring (11) is completely compressed when the piston (2) is at the dead point; when the crank shaft (20) starts to rotate clockwise, the piston (2) pushes the connection rod (4) down from the dead point by means of the cressure created by the gas exploded in the cylinder (1); that the said pushing motion is additionally effected by the compressed spring (11) being supported by the compression arm bracket, pushing the larger eccentric down wards by means of the compression arm (5) ; that both effects act on the smaller eccentric (6) in the larger one (5) and the crank peg (7) inside the small eccentric (6) is pushed downwards by an additional moment arm and that consequently the turning moment applied on the crank shaft (20) is enhanced due to the effect of the additional moment arm on the crank peg (7).

2. Eccentric and spring system in the internal and external combustion motors with piston, according to Claim 1, characterized with the guiding arm (6) one end of which is on the crank peg (7) in the connection rod (7), manufactured as fixed on the small eccentric (6) and the other end of which is provided with a channel, a guiding support ball connected to the motor body, being engaged into the said channel, (15) and when the crank shaft (20) rotates to start the motor, which provides the motion of the eccentric in the connection rod (4), as joined to the support.

3. Eccentric and spring system in the internal and external combustion motors with piston, according to Claim 1, characterized with the spring compression arm (5) carrying the spring compression mechanism (8), connected to the spring (11) over the spring compression joint (12), one end of which is

connected to the larger eccentric on the crank peg (7) in the connection rod (4) and the other end of which is provided with a channel (14) so that the spring compression support ball (9) can move in it.

4. Eccentric and spring system in the internal and external combustion motors with piston, according to Claim 1, characterized with a spring (11) one end of which is connected to the spring compression mechanism (8) and the other end, to the motor body.

5. Eccentric and spring system in the internal and external combustion motors with piston, according to Claims 1 and 3, characterized in that the said larger eccentric (5) is directly acted upon by the spring (11).

6. Eccentric and spring system in the internal and external combustion motors with piston, according to Claims 1 and 4, characterized in that the effect of the said spring (11) on the spring compression mechanism (8) remains constant with respect to the support point.

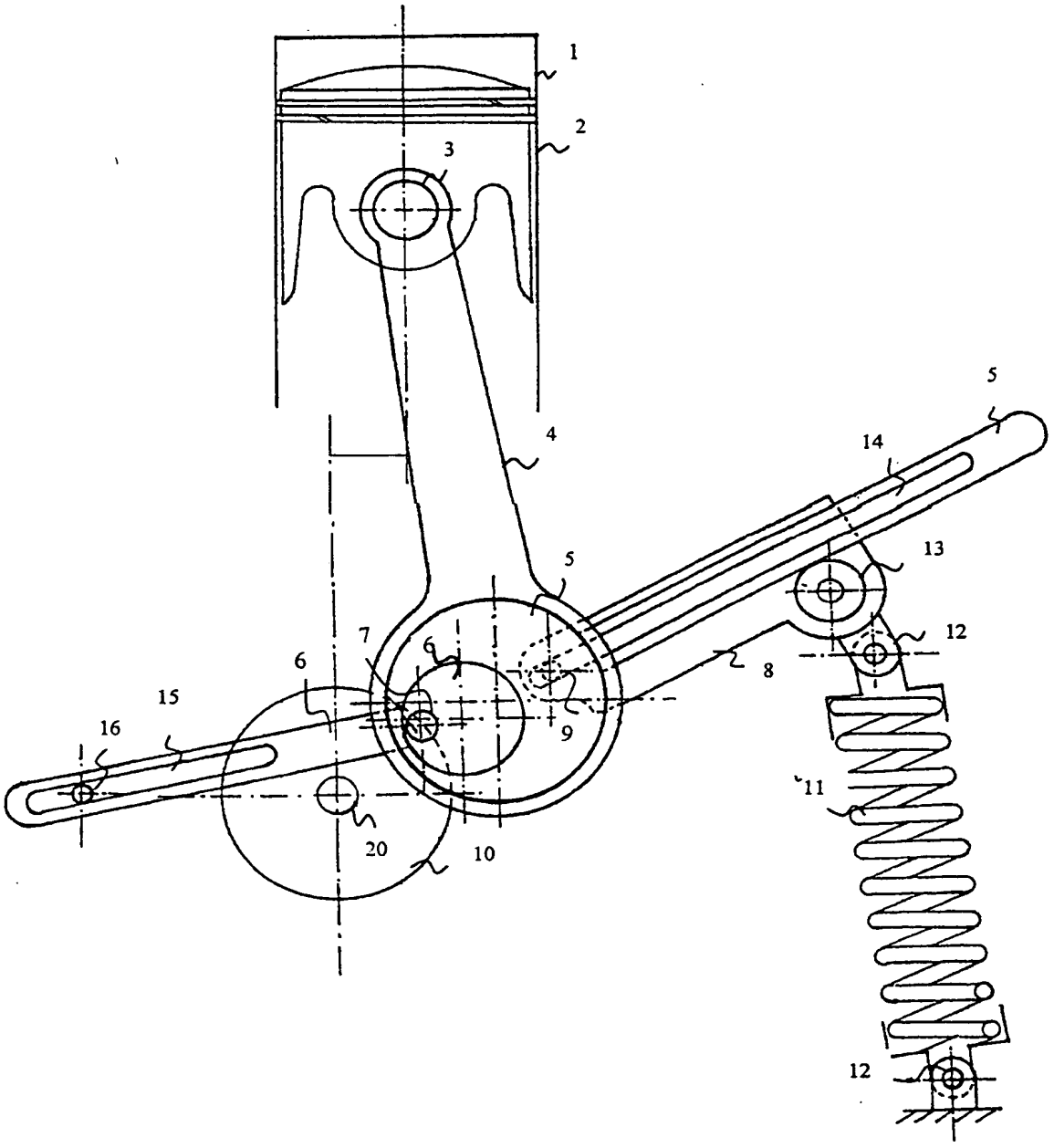

Figure 1

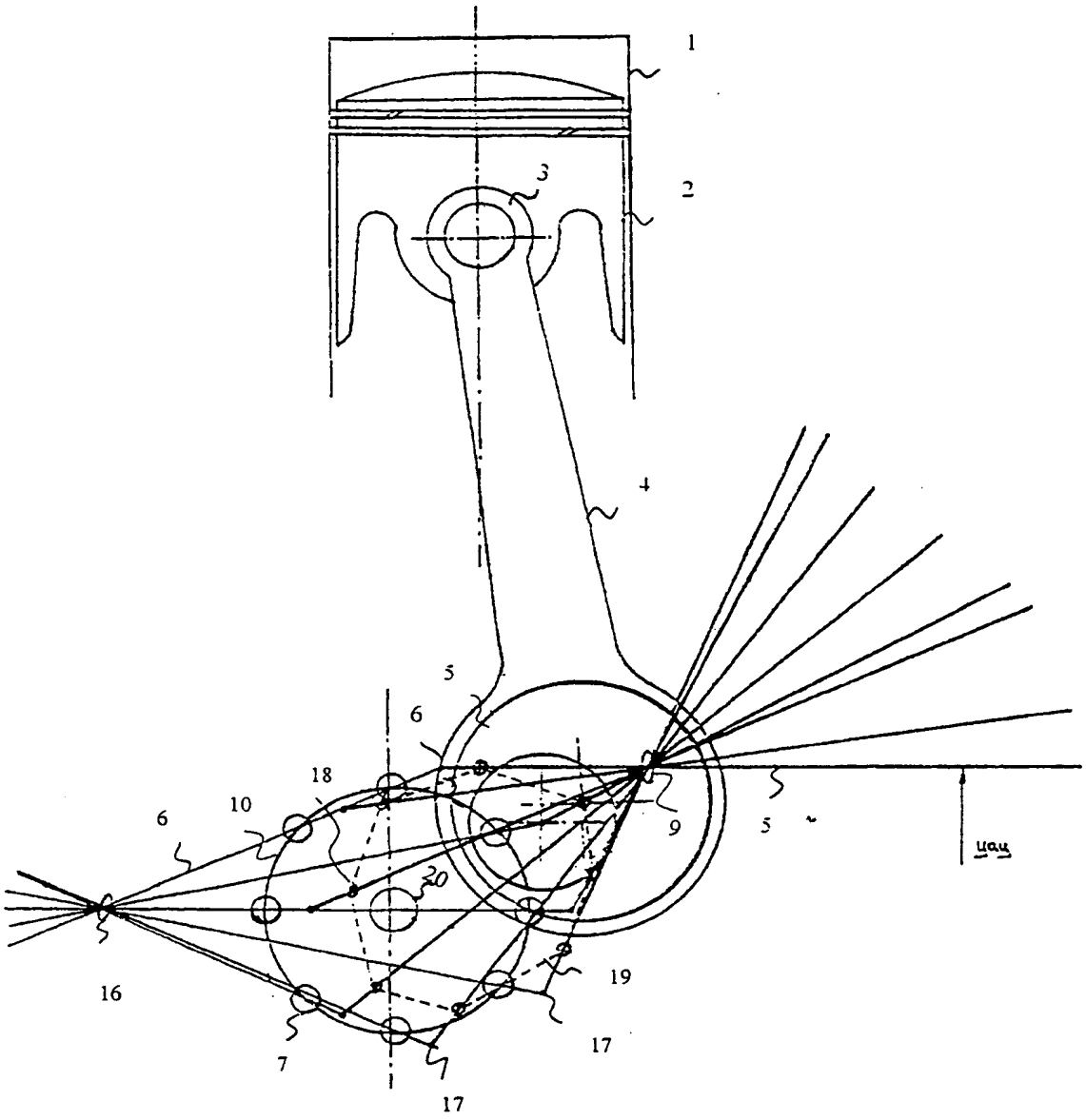

Figure 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/TR 99/00033

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: F 02 B 75/32; F 01 B 9/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7]: F 01 B 9/02; F 02 B 75/32

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2287908 A (SCHMIDT) 30 June 1942 (30.06.42) fig. 1, 4-7; page 1, right column, line 53 - page 2, left column, line 56.	1-6
A	FR 1146123 A (SCHNEIDER) 06 November 1957 (06.11.57) fig. 1, 2, 10, 12.	1-6
A	US 3693463 A (GARMAN) 26 September 1972 (26.09.72) fig. 6-9; column 5, line 53 - column 7, line 12.	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
04 November 1999 (04.11.99)	21 December 1999 (21.12.99)
Name and mailing adress of the ISA/AT Austrian Patent Office Kohlmarkt 8-10; A-1014 Vienna Facsimile No. 1/53424/200	Authorized officer Fietz Telephone No. 1/53424/358

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Information on patent family members

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Im Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
US A 2287909		keine - none - rien	
US A 2287908		keine - none - rien	
FR A 1146123		keine - none - rien	
US A 3693463	26-09-1972	keine - none - rien	